PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-242167

(43)Date of publication of application : 21.09.1993

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(51)Int.Cl. G06F 15/40

G06F 3/14

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(54) POINTER RETRIEVAL DEVICE FOR RASTER DRAWING AND METHOD FOR DISPLAYING VECTOR DATA ON RASTER DRAWING

(57)Abstract:

PURPOSE: To provide the point retrieval device for the raster drawing which makes scale-up operation efficient, speeds up scrolling, and superimposes the vector data on the raster drawing relatively easily at a low cost by using the raster drawing.

CONSTITUTION: An enlarged scale-up drawing 49 which corresponds to an index drawing 45 one to one is stored, a cutting range 47 is displayed on the index drawing, and this cutting range 47 is cut from the scale-up drawing and displayed on a CRT display device; and the cutting range 47 is scrolled vertically or horizontally and the scale-up drawing corresponding to the cutting range is cut successively following up the horizontal or vertical scrolling operation of the cutting range 47 and displayed on a cutting display means.

LEGAL STATUS [Date of request for examination] 13.01.1994

[Date of sending the examiner's decision of rejection] 27.08.1996

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1] An index drawing display means to display the index drawing which is point retrieval equipment of the raster drawing with which the location of the arbitration on a raster drawing is searched, and is used in order to specify a retrieval location, A scale-up drawing storage means to memorize the expanded scale-up drawing corresponding to said index drawing by 1 to 1, A logging range display means to display the logging range for specifying a retrieval location on said index drawing, A logging display means to start and display said logging range from said scale-up drawing, A scrolling means to scroll said logging range vertically or horizontally, So that the scale-up drawing corresponding to this logging range may be cut down serially and it may display with said logging display means, following the logging range which scrolls vertically or horizontally with this scrolling means at scrolling actuation Point retrieval equipment of the raster drawing characterized by having the scrolling control means to control.

[Claim 2] An index drawing display means to be point retrieval equipment of the raster drawing with which the location of the arbitration on a raster drawing is searched, and to display the whole index drawing divided into two or more partitions used in order to specify a retrieval location, A partition index drawing

storage means to memorize two or more partition index drawings expanded by 1 to 1 to the indexes corresponding to each of two or more partitions of said index drawing, A scale-up drawing storage means to memorize two or more scale-up drawings further expanded by 1 to 1 rather than the amplification for indexes corresponding to each of two or more partitions of said index drawing, A retrieval partition assignment means to specify one partition in which the location which wants to search of two or more partitions on said index drawing exists, A partition index drawing display means to choose and display said partition index drawing corresponding to the partition specified with this retrieval partition assignment means, A logging range display means to display the logging range for specifying a location searching on the partition index drawing displayed with this partition index drawing display means, A logging display means to start and display said logging range from the scale-up drawing corresponding to said partition index drawing by which it was indicated by selection, A scrolling means to scroll said logging range vertically or horizontally, So that the scale-up drawing corresponding to this logging range may be cut down serially and it may display with said logging display means, following scrolling actuation in the logging range which scrolls vertically or horizontally with this scrolling means Point retrieval equipment of the raster drawing characterized by having the scrolling control means to control.

[Claim 3] It is the method of presentation of the vector data to the raster drawing which piles up and displays the vector data expressed with an arbitration coordinate on the raster drawing expressed with the device coordinate of a dot unit. Define as a parameter the arbitration coordinate of the corner where a raster drawing counters, find the distance in the arbitration system of coordinates per dot on a raster drawing, and said parameter and distance are used. The method of presentation of the vector data to the raster drawing characterized by piling up and displaying vector data on a raster drawing with the coordinate which performed conversion to the device coordinate of an arbitration coordinate, and conversion on the arbitration coordinate of a device coordinate, and was acquired by this coordinate transformation.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the method of presentation of the vector data to the raster drawing which piles up and displays vector data on the point retrieval equipment of the raster drawing with which the location of the

arbitration on a raster drawing is searched, and a raster drawing.

[0002]

[Description of the Prior Art] For example, although it is necessary to search locations of the existing arbitration, such as a desired facility, and to carry out point assignment in drawings, such as a road map and a housing map, since the point itself is conventionally shown by the arbitration coordinate, the drawing of a vector format is being used for the point retrieval equipment which performs such point retrieval.

[0003] Since it is expensive while the drawing of a vector format requires the processing time at the time of creation manday displaying on this top enormously as compared with the drawing of a raster format and, it can consider the point retrieval system which used the drawing of a raster format.

[0004]

[Problem(s) to be Solved by the Invention] However, in the point retrieval equipment using a raster drawing, the increase in efficiency of the scale-up of a drawing, improvement in the speed of scrolling of a raster drawing, and the system that performs comparatively simply and cheaply the superposition display of the vector data to a raster drawing top further are not yet developed conventionally.

[0005] This invention was made in view of the above, and the place made into

the object is to offer the method of presentation of the vector data to the point retrieval equipment of a raster drawing and the raster drawing which can perform comparatively simply and cheaply the increase in efficiency of a scale-up, improvement in the speed of scrolling, and the superposition display of the vector data to a raster drawing top using a raster drawing.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned object, the scrolling equipment of the raster drawing of this invention An index drawing display means to display the index drawing which is point retrieval equipment of the raster drawing with which the location of the arbitration on a raster drawing is searched, and is used in order to specify a retrieval location, A scale-up drawing storage means to memorize the expanded scale-up drawing corresponding to said index drawing by 1 to 1, A logging range display means to display the logging range for specifying a retrieval location on said index drawing, A logging display means to start and display said logging range from said scale-up drawing, A scrolling means to scroll said logging range vertically or horizontally, So that the scale-up drawing corresponding to this logging range may be cut down serially and it may display with said logging display means, following the logging range which scrolls vertically or horizontally with this scrolling means at scrolling actuation Let it be a summary to have the scrolling control means to control.

[0007] Moreover, the point retrieval equipment of the raster drawing of this invention An index drawing display means to be point retrieval equipment of the raster drawing with which the location of the arbitration on a raster drawing is searched, and to display the whole index drawing divided into two or more partitions used in order to specify a retrieval location, A partition index drawing storage means to memorize two or more partition index drawings expanded by 1 to 1 to the indexes corresponding to each of two or more partitions of said index drawing, A scale-up drawing storage means to memorize two or more scale-up drawings further expanded by 1 to 1 rather than the amplification for indexes corresponding to each of two or more partitions of said index drawing, A retrieval partition assignment means to specify one partition in which the location which wants to search of two or more partitions on said index drawing exists, A partition index drawing display means to choose and display said partition index drawing corresponding to the partition specified with this retrieval partition assignment means, A logging range display means to display the logging range for specifying a location searching on the partition index drawing displayed with this partition index drawing display means, A logging display means to start and display said logging range from the scale-up drawing corresponding to said partition index drawing by which it was indicated by selection, A scrolling means to scroll said logging range vertically or horizontally, So that the scale-up

drawing corresponding to this logging range may be cut down serially and it may display with said logging display means, following scrolling actuation in the logging range which scrolls vertically or horizontally with this scrolling means Let it be a summary to have the scrolling control means to control.

[0008] Furthermore, the method of presentation of the vector data to the raster drawing of this invention It is the method of presentation of the vector data to the raster drawing which piles up and displays the vector data expressed with an arbitration coordinate on the raster drawing expressed with the device coordinate of a dot unit. Define as a parameter the arbitration coordinate of the corner where a raster drawing counters, find the distance in the arbitration system of coordinates per dot on a raster drawing, and said parameter and distance are used. Conversion to the device coordinate of an arbitration coordinate and conversion on the arbitration coordinate of a device coordinate are performed, and let it be a summary to pile up and display vector data on a raster drawing with the coordinate acquired by this coordinate transformation.

[0009]

[Function] With the point retrieval equipment of the raster drawing of this invention Memorize the expanded scale-up drawing corresponding to an index drawing by 1 to 1, and start on an index drawing, and display the range and this logging range is started from a scale-up drawing. Express as a logging display

means and said logging range is scrolled vertically or horizontally. It is controlling to cut down serially the scale-up drawing corresponding to this logging range, to start, and to display with a display means, following this logging range that scrolls vertically or horizontally at scrolling actuation.

[0010] moreover, with the point retrieval equipment of the raster drawing of this invention Display the whole index drawing divided into two or more partitions, and two or more partition index drawings expanded by 1 to 1 to the indexes corresponding to each of two or more partitions of an index drawing are prepared. Two or more scale-up drawings further expanded by 1 to 1 rather than the amplification for indexes corresponding to each of two or more partitions of an index drawing are memorized for the scale-up drawing storage means. One partition in which the location which wants to search of two or more partitions on an index drawing exists is specified. The partition index drawing corresponding to this specified partition is chosen and displayed. Display the logging range for specifying a location searching on this displayed partition index drawing, and this logging range is started from the scale-up drawing corresponding to said partition index drawing by which it was indicated by selection. Express as a logging display means and said logging range is scrolled vertically or horizontally. It is controlling to cut down serially the scale-up drawing corresponding to this logging range, and to display with said logging display means, following this

logging range that scrolls vertically or horizontally at scrolling actuation.

[0011] Furthermore, the method of presentation of the vector data to the raster drawing of this invention defines as a parameter the arbitration coordinate of the corner where a raster drawing counters, the distance in the arbitration system of coordinates per dot on a raster drawing is found, said parameter and distance are used, conversion to the device coordinate of an arbitration coordinate and conversion on the arbitration coordinate of a device coordinate are performed, and vector data is piled up and displayed on a raster drawing with the coordinate acquired by this coordinate transformation.

[0012]

[Example] Hereafter, the example of this invention is explained using a drawing.

[0013] Drawing 1 is the explanatory view showing the scale-up of the retrieval location in the point retrieval equipment of the raster drawing concerning one example of this invention, and drawing 2 is the block diagram showing the configuration of the point retrieval equipment of the raster drawing of the example shown in drawing 1 .

[0014] First, the configuration of this point retrieval equipment is explained with reference to drawing 2 . As shown in this drawing, the point retrieval equipment of a raster drawing for example, in the common bus 3 which the whole actuation is controlled using CPU1 which consists of a microprocessor etc., and consists

of a data bus, an address bus, etc. from this CPU1 The main memory 5 which consists of RAM etc., the index map which is the index drawing divided into two or more partitions, Two or more partition index drawings expanded to the indexes corresponding to said two or more partitions by 1 to 1, plurality -- a partition -- each -- one -- a pair -- one -- corresponding -- an index -- ** -- amplification -- further -- expanding -- having had -- plurality -- a scale-up -- a drawing -- etc. -- memorizing -- **** -- external storage -- it is -- a hard disk -- seven -- a floppy disk -- containing -- a floppy disk -- (-- FD --) -- a drive -- nine -- 11 -- Input CRT display device 13 and the various information which display an index map, a partition index drawing, a scale-up drawing, etc., or The logging range which shows a retrieval location is specified, or the keyboard 15 which has the various keys for directing scrolling to the direction of a vertical or horizontal request is connected.

[0015] In drawing 1 , the index map 41 which is an index drawing has two or more partitions 43 divide and it is indicated by the rectangular grid that are easy to specify a location to search. And if it specifies with the mouse which does not key or illustrate one corresponding partition from a keyboard 15 to search among two or more of these partitions 43, as the partition index drawing corresponding to this specified partition shows this drawing by 45, it will be displayed on CRT display device 13. This partition index drawing 45 is memorized by the hard disk

7 which are two or more external storage respectively corresponding to said two or more partitions, if specified that it mentioned above, reading appearance of the partition index drawing 45 corresponding to the partition as which it was specified in two or more of these partition index drawings will be carried out from a hard disk 7, and will be memorized by the buffer memory in main memory 5, and will be displayed on CRT display device 13.

[0016] In addition, drawing 3 shows this index map 41, two or more partitions 43, and the relation of the partition index drawing 45.

[0017] Thus, if the partition index drawing 45 is displayed on CRT display device 13, a location to search on this partition index drawing 45 will be discovered in a near estimate, and as the range including this retrieval location is started and the rectangular dotted line 47 shows on the partition index drawing 45 of drawing 1 as range, it will specify. Thus, if the logging range 47 is specified on the partition index drawing 45, it starts, and reading appearance of the scale-up drawing which is this specified enlarged section corresponding to the range 47 will be carried out from a hard disk 7, and it will be memorized by main memory 5.

[0018] furthermore, to each of two or more partition index drawings 45 prepared in the detail corresponding to each of two or more partitions 43, respectively Since it corresponds, respectively and two or more scale-up drawings are memorized by the hard disk 7 As mentioned above, reading appearance of the

scale-up drawing corresponding to the partition index drawing 45 with which the logging range 47 was specified is carried out to main memory 5 from a hard disk 7. The enlarged display of the scale-up part drawing side specified in said logging range 47 in this scale-up drawing by which reading appearance was carried out will be carried out to CRT display device 13.

[0019] Drawing 4 shows the relation between this partition index drawing 45, the logging range 47 shown by the rectangular dotted line, this partition index drawing 45, and the corresponding scale-up drawing 49.

[0020] Thus, although it is displayed as a scale-up part drawing side where the location to search to CRT display device 13 was expanded and a retrieval location can be detected accurately by this thus, when shifted from the scale-up drawing which could not detect the retrieval range of desired, for example, was displayed when the scale-up drawing by which the enlarged display was carried out was seen for a while The scale-up drawing by which the enlarged display was carried out as shown in drawing 4 can be scrolled towards a vertical or horizontal request.

[0021] This scrolling processing can be scrolled in the direction same as a scale-up drawing by moving by the arrow key of a keyboard 15 etc. in the logging range 47 displayed on the partition index drawing 45 as shown in drawing 4 .

[0022] Furthermore, when reading appearance of the scale-up drawing is carried out from a hard disk 7 and it is memorized by main memory 5 by this scrolling processing in detail, while the ring-like buffer memory in main memory 5 memorizes As this ring-like buffer memory is shown in drawing 5 , while left memory area 33b of the same memory size as the right-and-left both sides of central memory area 33a the image data of a scale-up drawing is remembered to be, and right memory area 33c are prepared It consists of buffers of a ring format logically so that the round rise of the tail end or its reverse from the head of this ring-like buffer memory 33 can be performed to vertical scrolling. Thereby, not only vertical scrolling but horizontal scrolling is also accelerated.

[0023] moreover, with the point retrieval equipment of this raster drawing In order to attain improvement in the speed of scrolling, when displaying on CRT display device 13 through two or more display planes from the ring-like buffer memory 33 in main memory 5 After using only one in two or more display planes during scrolling and completing scrolling processing, while trying to memorize data to other display planes, at the time of scrolling, the memory move instruction is used further, without using image operating instructions. Moreover, in horizontal scrolling, bit manipulation is made unnecessary for the amount of unit scrolling as 8 bits, i.e., 1 byte, and improvement in the speed of scrolling is in drawing by these.

[0024] Although it is necessary to pile up and display the vector data expressed with an arbitration coordinate on the raster drawing expressed with the point retrieval equipment of the raster drawing of the example mentioned above by the device coordinate of a dot unit, in order to pile up and display the data of two kinds of system of coordinates, it is necessary to change the drawing of a raster format into arbitration system of coordinates or reverse, and to change vector data into a device coordinate. Moreover, the drawing and vector data of a raster format also need to separate and manage, and to be able to respond enough is still more nearly required for modification of substitution of a drawing etc. That is, the drawing and vector data of a raster format are independent data, and to display on equipment, it is necessary to perform coordinate transformation dynamically.

[0025] Then, while the parameter defines the arbitration coordinate of the upper left and the lower right which is the corner where a raster drawing counters beforehand with this equipment, when displaying vector data on a raster drawing, the distance in the arbitration system of coordinates per dot of the drawing of a raster format was found, the coordinate transformation formula shown in these parameters, distance data, and the following was used, and the arbitration coordinate of vector data is changed into the device coordinate. In addition, as for it being careful here, in a vertical coordinate (Y coordinate), the upper part of

a device-coordinate system is a zero, and arbitration system of coordinates are the points that the bottom serves as a zero.

[0026] The formula which changes an arbitration coordinate (WX, WY) into a device coordinate (X, Y) is as follows.

[0027]

XP=(DX2-DX1)/VXYP= (DY2-DY1)/VYX = (WX-DX1)/XPY =VY- (WY-DY1)/YP and the formula which changes a device-coordinate system (X, Y) into arbitration system of coordinates (WX, WY) are as follows.

[0028]

In a two to Y*YP XP=(DX2-DX1)/VXYP=(DY2-DY1)/VYX=DX1+X*XPY=DY formula VX: Number VYof dots with a horizontal image data : Number DXof dots of perpendicular direction of image data 1: Distance YP per right-end arbitration coordinate XP:horizontal 1 dot of the perpendicular direction on the left-end arbitration coordinate DY2:equipment of the perpendicular direction on the horizontal right-end arbitration coordinate DY1:equipment on the horizontal left-end arbitration coordinate DX2:equipment on equipment: It is the distance per 1 dot of perpendicular directions.

[0029]

[Effect of the Invention] According to this invention, as explained above, memorize the expanded scale-up drawing corresponding to an index drawing by

1 to 1, and start on an index drawing, and display the range and this logging range is started from a scale-up drawing. Express as a logging display means and said logging range is scrolled vertically or horizontally. So that the scale-up drawing corresponding to this logging range may be cut down serially, it may start and it may display with a display means, following this logging range that scrolls vertically or horizontally at scrolling actuation control or Moreover, display the whole index drawing divided into two or more partitions, and two or more partition index drawings expanded by 1 to 1 to the indexes corresponding to each of two or more partitions of an index drawing are prepared. Two or more scale-up drawings further expanded by 1 to 1 rather than the amplification for indexes corresponding to each of two or more partitions of an index drawing are memorized for the scale-up drawing storage means. One partition in which the location which wants to search of two or more partitions on an index drawing exists is specified. The partition index drawing corresponding to this specified partition is chosen and displayed. Display the logging range for specifying a location searching on this displayed partition index drawing, and this logging range is started from the scale-up drawing corresponding to said partition index drawing by which it was indicated by selection. Express as a logging display means and said logging range is scrolled vertically or horizontally. Since it is controlling to cut down serially the scale-up drawing corresponding to this

logging range, and to display with said logging display means, following this logging range that scrolls vertically or horizontally at scrolling actuation Improvement in the speed of the scale-up in a raster drawing and improvement in the speed of scrolling can be performed comparatively simply and cheaply.

[0030] Furthermore, according to this invention, define as a parameter the arbitration coordinate of the corner where a raster drawing counters, find the distance in the arbitration system of coordinates per dot on a raster drawing, and said parameter and distance are used. Since vector data is piled up and displayed on a raster drawing with the coordinate which performed conversion to the device coordinate of an arbitration coordinate, and conversion on the arbitration coordinate of a device coordinate, and was acquired by this coordinate transformation, on a raster drawing, vector data is made to pile up mutually comparatively simply and accurately, and can be displayed.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view showing the scale-up of the retrieval location in the point retrieval equipment of the raster drawing concerning one

example of this invention.

[Drawing 2] It is the block diagram showing the configuration of the point retrieval equipment of the raster drawing of the example shown in drawing 1 .

[Drawing 3] It is the explanatory view showing the relation of the index map and partition index drawing which are used for the point retrieval equipment of drawing 1 and the raster drawing shown in 2.

[Drawing 4] It is the explanatory view showing the relation between drawing 1 , the partition index drawing used for the point retrieval equipment of the raster drawing shown in 2, the logging range, and a scale-up drawing.

[Drawing 5] It is drawing showing the configuration of the ring-like buffer memory used for the point retrieval equipment of drawing 1 and the raster drawing of 2.

[Description of Notations]

1 CPU

5 Main Memory

7 Hard Disk

13 CRT Display Device

15 Keyboard

33 Ring-like Buffer Memory